

## Notice of Allowability

Application No.

10/710,629

Examiner

Thomas R. Artman

Applicant(s)

WANG ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 18 September 2006.
2. ☒ The allowed claim(s) is/are 1-7, 9, 13-17, 19 and 21-23.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 200610.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

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### **EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John Artz, Reg. No. 25,824, on October 26, 2006. Please see the attached PTOL-413B for a record of the substance of the interview.

The application has been amended as follows:

#### **IN THE CLAIMS:**

Claim 1, line 9: insert, at the end of the line: -- wherein said heat shield comprises at least one hole that extends radially, relative to an axis of rotation of said anode, to allow thermal energy transfer between the anode and said at least one bearing; --

Claim 11: cancel in its entirety.

Claim 12: cancel in its entirety.

#### ***Allowable Subject Matter***

Claims 1-7, 9, 13-17, 19 and 21-23 are allowed.

The following is an examiner's statement of reasons for allowance:

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The prior art of record neither teaches nor reasonably suggests the anode assembly as claimed in claim 1, specifically:

a) a thermally conductive bearing encasement covering at least a portion of at least one bearing upon which a rotating anode rotates,

b) a thermal shield that has a height set for temperature continuity between bearings, and

c) where the thermal shield has at least one hole radially oriented with respect to the axis of rotation of the anode, in order to allow thermal energy transfer between the anode and the at least one bearing, such that

d) the bearing encasement and the thermal shield prevent a predetermined amount of focal spot displacement,

as required by the combination as claimed in claim 1.

Claims 2-7, 9 and 13-15 are allowed by virtue of their dependency.

The prior art of record neither teaches nor reasonably suggests the x-ray source as claimed in claim 16, specifically:

a) a thermally conductive bearing encasement covering at least a portion of at least one bearing upon which a rotating anode rotates,

b) a thermal shield that resides axially between the bearing encasement and the anode,

c) where the thermal shield has at least one hole radially oriented with respect to the axis of rotation of the anode, in order to allow thermal energy transfer between the anode and the at least one bearing, and further where

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d) the bearing encasement and the thermal shield prevent a predetermined amount of focal spot displacement,

as required by the combination as claimed in claim 16.

Claim 17 is allowed by virtue of its dependency.

The prior art of record neither teaches nor reasonably suggests the x-ray source as claimed in claim 19, specifically:

a) a thermally conductive bearing encasement covering at least a portion of at least one bearing upon which a rotating anode rotates,

b) a heat shield that resides axially between the bearing encasement and the anode,

c) where the heat shield has at least one hole oriented radially inward with respect to the axis of rotation of the anode, in order to facilitate temperature continuity between front and rear bearings of the at least one bearing,

as required by the combination as claimed in claim 19.

The prior art of record neither teaches nor reasonably suggests the method of determining a control alloy expansion material for the thermally conductive bearing encasement by the material's elastic modulus and thermal expansion coefficient, where the necessary elastic modulus and thermal expansion coefficient are determined by a maximum allowable focal spot displacement, as required by the combination as claimed in claim 21.

Claims 22 and 23 are allowed by virtue of their dependency.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Snyder (US 6,477,231 B2) and Lu (US 6,603,834) teach a thermal shield that maintains temperature continuity between bearings. Wandke (US 6,445,770 B1) teaches a structure for maintaining temperature equality between bearings.

Andrews (US 2005/0243969 A1) teaches empirical and experimental determinations of focal spot displacement.

Kuzniar (US 6,295,338 B1), Higgins (US 6,735,281 B2) and Hansen (US 6,553,097 B2) teach the use of nickel-iron alloys for improved thermal characteristics of bearing encasements and other critical structures within a rotating anode x-ray tube.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R. Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thomas R. Artman  
Patent Examiner



EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER